

Table S1 Comparison of main candidate models, after convergence

Model number	Model	Parameters	AIC	Population bias	Population imprecision
1	1 compartment	Ke, V	2169	-1.03	1.83
2	2 compartments	Ke, V, KCP, KPC	2172	-1.34	1.51
3	1 compartment with non-renal elimination	$Ke1, Ke2, V$	2172	0.11	3.54
4	2 compartments with non-renal elimination	$Ke1, Ke2, KCP, KPC, V$	2174	-1.43	1.43
5	#1 with WT as covariate on V	#1 + WT $V = V1 \times (\frac{WT}{71})^{0.75}$	2181	-0.53	2.61
6	#1 with eGFR as covariate on Ke	#1 + eGFR $Ke = Ke1 \times (\frac{eGFR}{61.5})^{Ke2}$	1938	0.48	2.60
7	#1 with aGFR as covariate on Ke	#1 + aGFR $Ke = Ke1 \times (\frac{aGFR}{64})^{Ke2}$	1907	2.06	3.84
8	#1 with aGFR as covariate on Ke	#1 + aGFR $Ke = Ke1 + (\frac{aGFR}{64})^{Ke2}$	1922	-0.61	1.66
9	#1 with aGFR as covariate on Ke	#1 + aGFR $Ke = (\frac{aGFR}{64})^{Ke1}$	1957	-0.21	1.45
10	#1 with aGFR as covariate on Ke (parameters range narrowed)	#1 + aGFR $Ke = (\frac{aGFR}{64})^{Ke1}$	1984	0.096	1.44

Bold indicates the model that was selected. AIC: Akaike information criterion; Ke : elimination rate constant from the central compartment; V : volume of the central compartment; KPC : transfer rate from peripheral to central compartment; KCP : transfer rate from central to peripheral compartment; WT: allometric scaling of V for weight; eGFR: power scaling of Ke

for estimation of glomerular filtration rate; aGFR: power scaling of Ke for absolute value of glomerular filtration rate. Initial parameter range were set to 0 – 10 for Ke , Ke_1 , Ke_2 , K_{CP} and K_{PC} and to 0 – 100 for V . For model #8, Ke_1 range was narrowed to 0.01 – 3 and V range to 1 – 15.

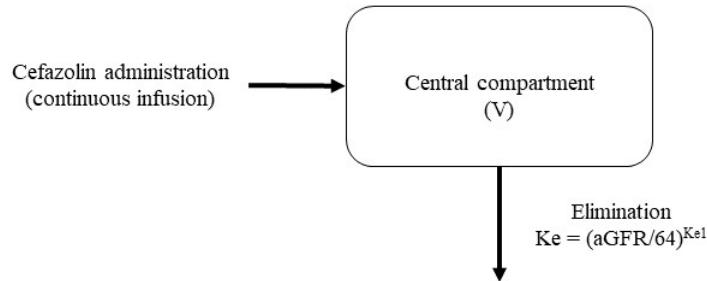


Fig. S1 Final structural model for continuous-infusion cefazolin. A one-compartment model with absolute value of estimated glomerular filtration rate (CKD-EPI formula) integrated as a covariate for elimination rate

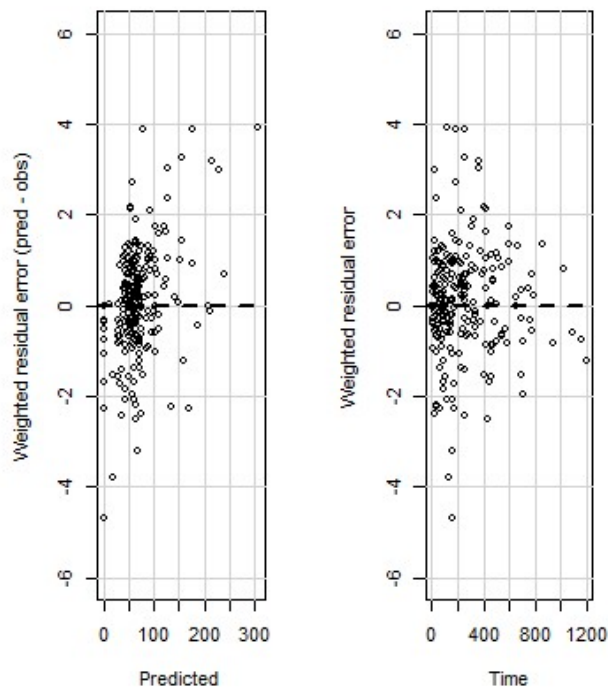


Fig. S2 Weighted residual error plotted against predicted concentrations (mg/L) (left) and time (h) (right) for population predictions

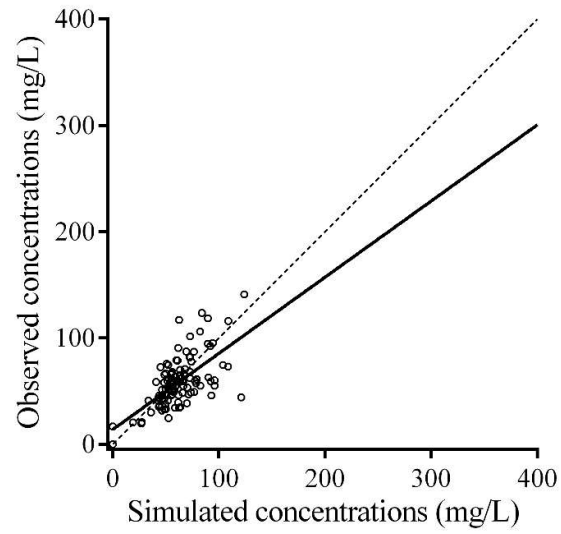


Fig. S3 Observed versus predicted cefazolin concentrations for the external dataset using prior support points of the pharmacokinetic parameters from the first dataset. The dashed line represents identity. The full line is the linear regression line ($R^2 = 0.40$).